

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
22 March 2001 (22.03.2001)

PCT

(10) International Publication Number
WO 01/20466 A1

(51) International Patent Classification⁷: **G06F 13/00,**
H04N 7/173

(21) International Application Number: PCT/US00/21707

(22) International Filing Date: 8 August 2000 (08.08.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
09/397,492 15 September 1999 (15.09.1999) US

(71) Applicant: **HOTV INC.** [US/US]; 11455 El Camino Real,
Suite 350, San Diego, CA 92130 (US).

(72) Inventors: **SHAH, Mehul**; 12633 El Camino Real #3408,
San Diego, CA 92130 (US). **SRINIVASAN, Anand**;
12718 Torrey Bluff Drive, #155, San Diego, CA 92130
(US). **SHASTRI, Vijnan**; 12664 Torrey Bluff Drive,
#216, San Diego, CA 92130 (US).

(74) Agent: **BOYS, Donald, R.**; P.O. Box 187, Aromas, CA
95004 (US).

(81) Designated States (*national*): AE, AG, AL, AM, AT, AU,
AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ,
DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR,
HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR,
LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ,
NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM,
TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

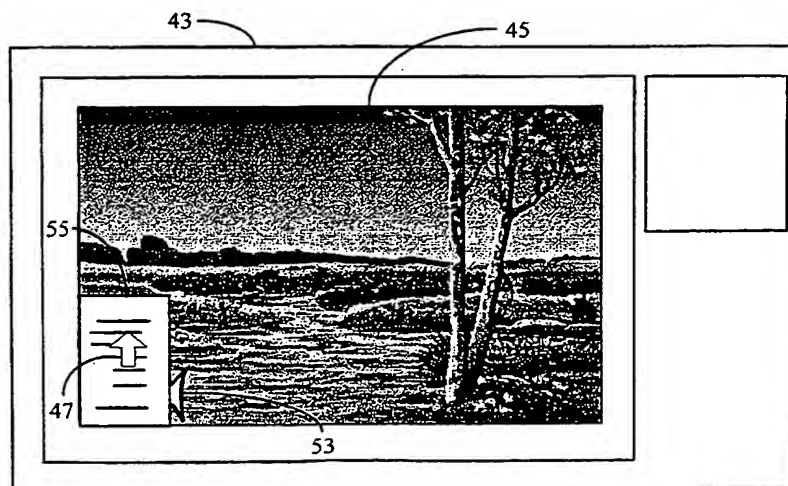
(84) Designated States (*regional*): ARIPO patent (GH, GM,
KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian
patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European
patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE,
IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG,
CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:

- With international search report.
- Before the expiration of the time limit for amending the
claims and to be republished in the event of receipt of
amendments.

For two-letter codes and other abbreviations, refer to the "Guid-
ance Notes on Codes and Abbreviations" appearing at the begin-
ning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND APPARATUS FOR INTEGRATING ANIMATION IN INTERACTIVE VIDEO



(57) Abstract: An interactive video display system includes a content provider streaming a primary video stream, an annotation data stream, and a viewing station having a video display apparatus for displaying both the primary video stream and annotation data stream. The annotation stream comprises an animated graphic (51) in a suitable graphic format such as (GIF). The animated graphic may move in the display in any direction, directed by data in the annotation stream, and may be associated with an entity (49) displayed from the primary video stream and moves with the image entity. In response to user interaction with an animated graphic hyperlink, alternative display entities may be sent in the annotation data stream. These alternative display entities may alternatively be sent along with the primary display entities with a specification as to how they would be displayed on the basis of user interaction.

WO 01/20466 A1

BEST AVAILABLE COPY

Method and Apparatus for Integrating Animation in Interactive Video

5

Field of the Invention

The present invention is in the field of interactive video, and pertains more particularly to apparatus and methods for authoring and enabling animation in
10 interactive video user interfaces.

Background of the Invention

15

With continuing development of new and better ways of delivering television and other video presentations to end users coupled with parallel development of computerized information systems such as the Internet, there have been concerted efforts to integrate various systems to provide enhanced information delivery and entertainment systems. For
20 example, developers are introducing integrated systems combining TVs with computer subsystems, so a TV may be used as a WEB browser, or a PC may be used for enhanced TV viewing.

In some systems, computer elements such as a CPU, memory, and the like, are built into the familiar chassis of a TV set. In such a system, the TV screen becomes the display
25 monitor in the computer mode. In such a system, conventional TV elements and circuitry are incorporated along with the computer elements, and capability is provided for a user to switch modes, or to view recorded or broadcast video with added computer interaction. One may thus, with a properly equipped system, select to view analog TV programs, digital TV programs, conventional cable TV, satellite TV, pay TV from various sources, video
30 delivered on the Internet, and to browse the WWW as well, displaying WEB pages and interacting with on-screen fields and relational systems for jumping to related information,

databases, and other WEB pages. The capabilities are often integrated into a single display, that is, one may view a broadcast presentation and also have a window on the display for WEB interaction.

In some other systems, computer elements are provided in an enclosure separate
5 from the TV, often referred to in the art as a set-top box. Set-top box systems have an advantage for providers in that they may be connected to conventional television sets, so end users don't have to buy a new TV along with the computer elements.

In such integrated systems, whether in a single enclosure or as set-top box systems, user input is typically through a hand-held device quite similar to a familiar remote
10 controller, usually having infra-red communication with the set-top box or a receiver in the integrated TV. For computer modes, such as WEB browsing, a cursor is displayed on the TV screen, and cursor manipulation is provided by buttons or other familiar pointer apparatus on the remote. Select buttons are also provided in the remote to perform the familiar function of such buttons on a pointer device, like a mouse or trackball more
15 familiar to computer users.

Set-top boxes and computer-integrated TVs adapted as described above typically have inputs for such as a TV antenna (analog), cable TV (analog or digital), more recently direct-satellite TV (digital), to Internet ports, and may also connect to video cassette
20 recorders and to mass storage devices such as hard disk drives and CD-ROM drives to provide a capability for uploading video data from such devices and presenting the dynamic result as a display on the TV screen.

The present inventors have noted that with the coupling of computer technology with TV, many capabilities familiar to computer users have been made available to TV
25 users. For example, ability to provide text annotation for TV presentations is considerably enhanced. Computer techniques such as Pix-on-Pix are now available, wherein separate TV presentations may be made in separate windows, or overlaid windows on the display screen. Separate windows may also support display from separate sources, such as an analog TV program in one window, a computer game in another, and a video conference in a third.

In typical prior art video authoring systems, end users receive a single video stream that contains the video data and any added annotated data such as subtitling, sponsor logos, information blocks, and the like. However, it is desirable to build upon the goal stated in the preceding paragraph above, by having separate streams, one containing video data, and
5 the other containing annotative data, that may arrive at and end user's location via different delivery media and be displayed synchronously on a suitable display screen.

In a system known to the inventors, hyper-video authoring is possible wherein a wide variety of added, often interactive, content is made available to viewers having an active connection to a video feed and an Internet connection for facilitating delivery of
10 interactive results. The system known to the inventor uses separate authoring stations or systems for use in what is termed hyper-video authoring by the inventor. Hyper-video authoring includes creating hot spots (interactive hyperlinks) in a video, providing interactive regions for tracked objects (methods known to the inventor), inserting URL's for user interaction, providing interactive banner ads, providing
15 interactive icons for launching instant replays of short video clips, adding audio/text annotation, and so on.

Annotated content may, in some instances, be delivered via alternate paths (typically the Internet) and synchronized with a main video stream being viewed at the user's end. In other instances, added content is combined at the provider end and
20 delivered as one stream (typically cable or digital feed) to the viewer. As a viewer interacts with provided content, Internet capability is utilized for the purpose of delivering stored information associated with the viewers interaction that may be viewed on the same display containing the offered video such as by a PIX on PIX method and so on. In some cases users, if so equipped, may elect to save and store
25 Internet delivered content to suitable data storage apparatus. In other aspects, such material may be saved and stored on-line at a server adapted for the purpose. In this case, a viewer may at a later time retrieve the material at his or her discretion.

One of the capabilities of the above-described system is the ability to provide tracking coordinates for an object in the video. By tracking the movement of an image
30 in a video presentation, an interactive region or hot spot may be embedded and caused

to follow a target image in the video presentation by virtue of the tracking-coordinate data included in an authored stream or embedded within a main video stream. The interactive region may be of the form of a halo surrounding an image, a semi-transparent area covering an Image, a portion of the image that has been altered in
5 some way to indicate that it is interactive, and so on.

By clicking on the interactive portion or region associated with an image entity, a viewer may obtain, by virtue of Internet or WAN connection, additional information about the image. Such information may be delivered to a viewer in the form of a WEB page, an order form, text information, additional interactive links, or other conventions
10 designed to further engage the viewer regarding the selected image. The authoring consists of identifying, creating, and embedding the tracking coordinates (path of the image) into the video data so that a subsequent author may associate a hyper-link or interactive region with the moving image.

In the present invention a similar capability to the tracking and selection of
15 image entities as hyperlinks is provided, but it not necessary that the hyperlinks follow moving entities in a video presentation. This new capability provides new animated entities in the displayed video with new and non-obvious functions.

It is known in the art that animated graphics files are used by artists to create and display with animation on such as Internet Web pages. One format used for this
20 purpose is called Graphics Interchange Format (GIF). GIF files are just one of several formats that may be used for animation, and are referred to here as representative and exemplary of all such formats. An animated GIF or other animated graphic is typically embedded in a web page. An animated graphic may play according to instruction when the web page is loaded, and others may have interactive links or animated
25 graphics on user interaction like mouse over or mouse click. Such animations may run in a same physical location, or may be programmed to move across a screen or display either on loading or on user interaction. A GIF typically has an 8-bit construction and an excellent compression method termed LZW. This makes it easy to transmit GIFs over the bandwidth-limited Internet and to display them on a suitable screen without

using excessive bandwidth or memory. Other suitable graphic file formats other than the GIF format may also be used for such interactive content.

Providing an executable animated graphic in a manner to be integrated with a primary video stream would allow authors to provide interactive graphic content on top of the video in an entertaining form without being limited to providing interaction capability to an image already in a main video. Such interactive overlaid content may be used for interactive advertisements.

What is clearly needed is a method and apparatus for embedding and interactively linking animated graphics into a main video or authored control stream such that the graphics would change or move on the screen or appear and disappear within the video automatically and/or by virtue of user participation such as mouse or keyboard interaction. Such a method and apparatus would expand prospects for interactive advertising and other information display.

15

Summary of the Invention

In a preferred embodiment of the present invention a video system is provided comprising a content provider streaming a primary video stream and an annotation data stream; and a viewing station having a video display apparatus for displaying both the primary video stream and the annotation data stream. The annotation data stream comprises one or more animated graphics in a format such as the Graphics Interchange Format (GIF) which is synchronized and displayed on the video.

In some embodiments the animated graphic moves in one or both of vertical or horizontal direction, or any other trajectories in the display, directed by data in the annotation data stream, and may be associated with an image entity displayed from the primary video stream, moving with the image entity.

The viewing station may further comprise a user input device for cursor control such as a mouse, and the animated graphic may be displayed as a hyperlink. User interaction with the animated graphic may either send a back-link signal to the content

provider or may execute some other action as per information in the annotation data stream.

If an action is specified in the annotation data stream in response to user interaction - a back link signal may or may not be used. Such actions on user interaction specified in the primary annotation data stream could be displaying an alternative graphic content, changing the motion of the graphic content, making the graphic content appear or disappear from the video or display other specific information in text or graphic format. Such content may be used for interactive gaming kind of applications to invite more participation from the user while he is watching the video. The advantage of specifying data about the action to be performed on user interaction in the primary annotation data stream is that a back-link signal is not required and the information about response to user interaction can be sent simultaneously to all users without requiring a separate communication channel for each user.

If the user interaction is sent to the content provider as a back-link signal, the content provider may, as a response, stream an alternative annotation stream, providing an alternative display on the video display apparatus at the viewing station. In this case the alternative annotation stream which contains the response to the user interaction is sent specifically to users who interact with the content.

In some cases the viewing station comprises a first high-bandwidth dedicated connection for receiving the primary video stream, and an Internet connection for receiving the annotation video stream, and the content provider comprises a first facility for streaming the primary video stream via the first connection, and an Internet-connected server for streaming the annotation video stream via the Internet. In these systems the annotation data stream first provides a first displayable indicia as a hyperlink, and in response to a backlink signal to the Internet-connected server initiated by user interaction with the first displayable indicia, the server provides additional information about the action to be performed such as displaying a web page or displaying other graphics on the video.

In some embodiments the first displayable indicia responds to a user interaction such as a mouse-over to display other animated graphics which in turn respond to user interaction to display other graphics or textual content or send a second backlink signal. In some of these embodiments the server responds to the second backlink
5 signal by sending a third displayable indicia in the annotation data stream.

In another aspect of the invention an interactive video system is provided, comprising a computerized display system comprising a video display apparatus, receiving apparatus for receiving and displaying both a primary video stream and an annotation stream on the display apparatus, a user input apparatus for a user to interact
10 with display entities, and a mechanism for sending backlink signals from the computerized display system; and an Internet-connected server for providing at least the annotation data stream and connected to the computerized display system in a manner to receive the backlink signals. The annotation data stream provides a first displayable indicia as a hyperlink, and the server responds to a backlink signal resulting
15 from user interaction with the first displayable indicia by providing in the annotation data stream a second displayable indicia.

In embodiments from this the second displayable indicia may also be a hyperlink. Also in these embodiments the first displayable hyperlink may send a first backlink signal as a result of a mouse-over, and the second displayable indicia may
20 then send a second backlink signal as a result of a mouse click. The second displayable indicia may be a company logo, which may display for a pre-determined time period and then disappear, and the annotation data stream from the server then provides a third displayable indicia. One of the first and second displayable indicia may comprise an animated Graphics Image Format (GIF) display. In this case the second GIF may
25 persist in the display for a pre-determined time period, then disappear, and the annotation data stream from the server then provides a third displayable indicia.

In these embodiments the first and second displayable indicia may move in one or both of vertical and horizontal directions in the display, directed by data in the annotation data stream, and may also be associated with an image entity in the primary
30 video stream, and move with the image entity.

In addition to the apparatus of the invention in multiple embodiments, as described generally above, methods for practicing the invention using the apparatus are taught as well, all in enabling detail below. The functionality taught for video display systems according to embodiments of the invention provides new ways of advertising, and new ways of presenting information to viewers with viewer participation in interactive video systems, and also provides new ways of doing an e-commerce transaction by introducing interactive advertising .

10

Brief Description of the Drawing Figures

Fig. 1 is an overview diagram of a video authoring and delivery system in an embodiment of the present invention.

Fig. 2 is a block diagram illustrating components of the authoring station of Fig. 1.

Fig. 3A is a plan view of an interactive PC/TV illustrating display and viewer interaction with a first animated graphic according to an embodiment of the present invention.

Fig. 3B is a plan view of the PC/TV of Fig. 3A illustrating a second animated graphic invoked in Fig. 4A.

Fig. 3C is a plan view of the PC/TV of Fig. 3A illustrating viewer interaction with the second animated graphic of Fig. 3B according to an embodiment of the present invention.

Fig. 3D is a plan view of the PC/TV of Fig. 3A illustrating a third animated graphic invoked in Fig. 3C.

30

Description of the Preferred Embodiments

It is an object of the present invention to provide a method and apparatus that enables an author annotating a primary video stream, which may be either digital or analog, to create and provide interactive animated graphics in video presentations. In 5
embodiments of the invention animated graphics, for example graphics in a GIF format, may be used in concert with hyperlinks of various sorts to provide activity sequences in an interactive video displays. The method and apparatus is described in enabling detail below.

10 Fig. 1 is a block diagram illustrating an exemplary overview of a video authoring and delivery system 9 as known to the Inventor and suitable for practicing the present invention. System 9 is exemplary of a system known to the inventor for receiving, authoring and sending video content to viewers who subscribe to a service defined by this capability. Exemplary components of system 9 include a broadcast 15
system 11, a video head end 13, an authoring station 15, a wide-area-network (WAN) 19 having an Internet Service Provide (ISP) including modems 24 and a server 26, and a plurality of subscribed viewers 17a through 17n.

Video head end 13 is defined as a source for live or pre-stored video feeds for the purpose of video authoring before delivery to viewers such as viewers 17a-n. 20
Video head-end 13 delivers video feed 21, which, in this embodiment, is diverted to authoring station 15 for the purpose of providing annotative and interactive content that will ultimately be displayed on equipment maintained by viewers 17a-n. Such content will either be combined or muxed into feed 21 and be displayed from one stream delivered to viewers, or may be delivered as a separate stream to be combined 25
or caused to display in synchronous mode on a viewer's system.

Feed 21 may be either an analog feed or a digital feed. If feed 21 is analog, it is converted to digital format for the purpose of authoring. Feed 21 may continue on to viewers as an analog feed. In another embodiment, feed 21 may be converted to digital format and remain as such for delivery to viewers 17a-n. Such variations in 30
video format, delivery methods of feed 21, and delivery methods of authored content

will depend, in part, on system architecture and customer equipment capability, and in part on the nature of added content and the intent of providers. There are many possible variations.

In this example, broadcast system 11 is capable of video delivery in digital or analog format over a cable connection, a satellite connection, or by any other high-bandwidth dedicated medium. The connections illustrated between viewers 17a-n and broadcast station 11 illustrate logical connections only. As previously described, video feed 21 is diverted in this instance, to station 15 for authoring.

Authoring station 15 is enhanced with a software application 22 which enables an author to provide video annotation to the primary video stream. The video annotation provided may be of a variety of sorts as described in the related prior application under the heading above "Cross-reference to related Documents". Such annotation includes, for example, associating a moving image entity (for example, a specific player in a sports event) in a primary video with a hyperlink by tracking the image and including coordinates of the image entity in the annotation data. Displayable graphics, such as icons, may be annotated to primary video streams and be displayed either as fixed icons or moving with tracked entities, and such icons may be rendered as hyperlinks, such that selecting an icon initiates a backlink signal to a server, just as a hyperlink works in a WEB page.

In some cases in the present invention animated GIFs are provided by an author through software 22 to be integrated with a primary video stream and used in ways more fully described below. Such animated GIFs may be created at the authoring station or retrieved from another source, inserted as metadata in a primary stream or in a separate stream to be later coordinated with the primary stream, and displayed as hyperlinks at a user's facility.

In the case of a pre-stored analog video, authoring may, of course, be performed off-line at the authors convenience. In this case, created content including animated GIFs may be timed to stream at the same time of the main video, unless, of course, the content is made part of the main video by virtue of VBI or HBI inserted metadata. In some cases authored content may be delivered ahead of a primary video

and later coordinated (synchronized) with the video. All analog video is converted to digital format at station 15 before authoring. Separate control streams remain digital and must be synchronized either at station 15, or at the viewer's end before successful display of an annotated presentation.

5 Because VBIs and HBIs in analog video streams are limited in capacity for inserted data, and may be overwritten by downstream processes, it is preferred that metadata including any animated GIFs be delivered in a separate digital control stream to be synchronized to the associated primary video at authoring station 15, at station 11 or at each viewer's location.

10 A feed 21a is illustrated as output from authoring station 15. Feed 21a represents the analog or digital video feed 21 after leaving station 15. A control stream 23, illustrated as output from station 15, represents a combined control stream containing any GIF metadata and, perhaps other forms of annotation metadata inserted by one or a plurality of authors. A control stream 23a represents stream 23 being
15 integrated with main feed 21 for combining or synchronization at station 11. This operation may alternatively be performed within station 15, in which case, only one feed would be output to station 11. Control stream 23 may also (and preferably) be delivered through WAN 19 to viewers by virtue of separate WAN connections maintained by viewers 17a -17n. WAN 19 may, in preferred embodiments, be the
20 Internet.

 WAN 19 is shown, as briefly described above, having a representative server 26 and modem bank 24 constituting an Internet Service Provider (ISP) accessed by users 17a-n through a public-switched telephone network represented by line 23. In practice separate users may have separate ISPs which may each access server 26. In
25 embodiments of the invention software 28 at server 26 in conjunction with stored or otherwise accessible content provides displayable entities, including animated GIF entities, to users 17 a-n in response to backlink signals as a result of users interacting with hyperlinks provided by metadata integrated with or coordinated with a primary video stream displayed at a user's station.

System 9 as illustrated herein may deliver analog or digital video content to viewer's 17a-n along with separate digital control streams that may arrive via alternate paths. System 9 may be altered with respect to architecture to facilitate many alternative embodiments as long as the main or basic components exist without
5 departing from the spirit and scope of the present invention.

Fig. 2 is a block diagram illustrating components of authoring station 15 of Fig. 1 according to an embodiment of the present invention. Station 15 may have a plurality of authors 1-4 and an authoring server 27. Authors 1-4 are preferably operating separate computerized control stations. There may be more or fewer
10 authors operating at station 15 without departing from the spirit and scope of the present invention. The inventor deems these four as adequate for the purpose of illustrating the present invention. Some of authors 1-4 may be automated stations and unmanned by live persons whereas persons assigned to specific authoring assignments may man some other stations.

15 This example supports real-time authoring as demonstrated by the architecture of authors 1-4. Video stream 21 is fed simultaneously in to each authoring station 1-4. If feed 21 is analog, it is converted to digital format either before arriving to, or at the location of each station 1-4. Each author 1-4 outputs a control stream 25a- 25d respectively. Each control stream 25a-d contains metadata particular to a particular
20 authoring assignment. For example, stream 25a contains animated GIF metadata. Streams 25b-d may contain other types of authored metadata. In this example, all the control streams are combined in an authoring server 27 and are output as one control stream 23, which is analogous to stream 23 of Fig. 1.

Stream 21 re-merges after exiting control stations 1-4 (authors). In some
25 embodiments, stream 21 is passed through server 27 for the purposed of synchronizing it with the combined control stream 23, however, this is not required to practice the present invention, as other methods for stream synchronization are known to the inventor and may be practiced at the provider end or at the viewers end.

In this case, main video 21 and control stream 23 are separate but synchronized
30 streams as they exit authoring station 15. In alternative embodiments, as previously

described, there may be only one combined stream leaving station 15. The animated GIF metadata is included in stream 23 with other annotation.

In this embodiment, authoring station 1 creates and prepares annotation that will be associated with animated GIFs. If the authoring at station 1 includes animated
5 GIFs then the author retrieves such GIFs from a library or other content provider, and inserts these as metadata into control stream 25a in real time. In many cases this first annotation will be a transparent hyperlink to a moving image entity in the primary video, as described above, or a static, displayable graphic, or icon. The initial authoring also includes adding interactive metadata, which provides hyperlink
10 capability according to viewer initiation such as a mouse-over or a click or double-click in a viewer's interface, described in further detail below. In many cases of the present invention, viewer interaction with a first hyperlink provided by the authoring capability described provides a second display, which may be an animated GIF, connection to additional information, or even further changes in display and action. In
15 the case of such further display resulting from an initial interaction, the further metadata annotation may provided by server 26 (Fig. 1) for example, in response to a backlink signal resulting from a user interacting with a hyperlink.

User interaction with hyperlinks whether or not the hyperlinks are associated with animated graphics is provided by conventional methods such as through pointer
20 operation, keyboard input or other known input techniques.

Fig.'s 3A-3D are exemplary displays on an interactive PC/TV at a viewer's premise illustrating various stages of viewer interaction with animated GIFs during a presentation of a video.

In Fig. 3A, an exemplary video presentation 45 is being displayed on a viewer's
25 PC/TV 43. For the purpose of discussion and example, the primary video is a short video clip sponsored by a travel agency. Presentation 45 illustrates a sequence from a vacation location being offered by the travel agency for the purpose of attracting vacation prospects to the area.

As presentation 45 displays on PC/TV 43, a first animated GIF 49 appears as a
30 dorsal fin of a fish swimming up and down a stream in the video. The path instruction

for GIF 49 has been programmed by an author at an authoring station into an annotation stream as described above, the annotation stream being sent to the user's station via server 26, such that GIF 49 appears to swim within the stream boundaries in the video sequence containing the stream. Gif 49 is provided as a hyperlink. To
5 progress to a next level, a viewer moves a cursor to the GIF.

There are several ways one may interact with a hyperlink. Activation may occur by a mouse-over, which means moving the screen cursor over the hyperlink area, by a click, by a double-click, or by combinations.

In Fig. 3B the dorsal GIF 49 is terminated as a result of the mouse-over, which
10 sends a backlink signal to server 26 (Fig. 1), which responds by sending a new annotation data stream to the user's station. The new annotation stream provides a second GIF 51 in the form of a full-bodied fish. Alternatively the GIF 51 may be sent along with GIF 49 in the primary annotation stream along with information about displaying GIF 51 as a result of user interaction to GIF 49. GIF 51 is programmed to
15 jump in and out of the stream staying within the stream's boundaries. GIF 51 may continue to display throughout the video waiting on a viewer's response, or may be timed to terminate automatically if the viewer does not respond. In one embodiment, when a scene change occurs from, for example, a sequence showing the stream to, perhaps a sequence showing a cabin offered for rent, GIF 51 will terminate and a new
20 interactive and animated GIF associated with the next sequence (cabin) may automatically appear. If a viewer chooses, he or she may obtain additional information by clicking on the second GIF (51) before the scene changes.

In Fig. 3C, the viewer has elected to click on GIF 51 in order to proceed to a next level. Clicking on GIF 51, in this example terminates the second GIF and
25 executes yet a third GIF. In Fig. 3D, a third GIF 53 in the form of a full bodied fish executes as described above, and immediately jumps to a sidebar area or to another specified location in the video where upon reaching it's destination, an information block 55 automatically pops up. Information block 55 contains text information associated with the vacation spot such as accommodation availability and pricing,

travel directions and optimum season information, available guide information for fishing in the stream, or any other imaginable information that may be provided.

In addition to simple text information, block 55 may contain interactive links in the form of text or graphics leading to additional sources of information such as to a WEB page hosted by the travel agency containing booking arrangements and the like. There are many possible arrangements. Block 55 may, in some embodiments, be an animated GIF with animation in the form of moving text. The use of a vacation video and travel agency as a host is an isolated example used simply to describe one possible application that may be provided in the practice of the present invention. Such an application may, perhaps, be provided in conjunction with a special interactive channel such as a travel channel where such interactive vacation videos regularly air.

In a preferred embodiment of the invention authoring at authoring stations of authoring system 15 of Fig. 1 includes associating complete packages of icons, GIFs and the like with a primary video stream. For example, the sequential displays described with reference to Figs. 3A-3C above are pre-authored as a related package and associated with the primary video at the same time. The alternative forms are all present in the annotation stream, and server 26 is programmed to provide the first form until a hyperlink is activated by a first method (mouse-over), then the second form in response to a second signal, and so forth.

It will be apparent to one with skill in the art that a very wide variety of desirable effects may be provided by the techniques of the present invention in different embodiments. For example, a first interactive hyperlink may be provided as an icon static anywhere in a displayed video. upon a mouse-over, the icon may show a text annotation, such as "click for local weather". Upon clicking, the icon may be replaced by an annotated GIF according to the weather; a blue sky with moving clouds for clear weather; a storm cloud with rain falling for stormy weather, and so on.

As another example, a first annotated display may provide an icon with a text script "weather update". A mouseover causes the icon to change temporarily to a StarbucksTM logo. After a short time, the logo disappears and a weather update appears in a sidebar or other window, or by an animated GIF showing the weather, as

described above. In this manner, short advertisements may be provided in the process of performing other functions.

In another example, a GIF may be provided in a primary video of such as a basketball game informing viewers that there are tickets available for an upcoming game. Clicks can be processed in a manner that the first 100 respondents, or even
5 numbered respondents of the first 200 for example, will be eligible to buy the 100 available tickets. The respondents identities are known, as the service is a subscription service, and the responses are by backlink from selecting a hyperlink. Applications to purchase may then be mailed to the lucky respondents, or there may be provision made
10 for online purchase, or purchase may be automatic and billed on the subscriber's account.

In yet another embodiment animated graphics may take the form of animated company logos or brands, and user interaction may result in any number of responses, including such as downloading coupons for discounts and the like.

15 Applications may be conceived for virtually any type of video presentation wherein an advertiser or sponsor may gain benefit by providing graphics such as GIFs and information associated with them. In other embodiments, animated GIFs may be prepared and used purely for entertainment or educational value instead of for selling products or for other advertisement purposes. Therefore, the method and apparatus of
20 the present invention should be afforded the broadest scope. The spirit and scope of the present invention is limited only by the claims that follow.

What is claimed is:

1. A video system comprising:
 - a content provider streaming a primary video stream and an annotation data
 - 5 stream; and
 - a viewing station having a video display apparatus for displaying both the
 - primary video stream and the annotation data stream;
 - wherein the annotation data stream comprises at least a first animated graphic
 - which displays on the video display.
- 10 2. The system of claim 1 wherein the first animated graphic moves in the display as directed by data in the annotation data stream.
3. The system of claim 2 wherein the moving first animated graphic is associated with
- 15 an image entity displayed from the primary video stream, and moves with the image entity.
4. The system of claim 1 wherein the viewing station further comprises a user input
- pointer device for cursor control and wherein user interaction by the pointer device
- 20 with the first animated graphic causes a change in the animated graphic display.
5. The system of claim 4 wherein user interaction with newly-appearing animated
- graphics causes additional animated graphics to appear.
- 25 6. The system of claim 4 wherein user interaction with the first animated graphic produces a back-link signal, and in response to the backlink signal the content provider streams an alternative annotation stream, providing an alternative display on the video display apparatus at the viewing station.

7. The system of claim 1 wherein the viewing station comprises a first high-bandwidth dedicated connection for receiving the primary video stream, and an Internet connection for receiving the annotation video stream, and the content provider comprises a first facility for streaming the primary video stream via the first
5 connection, and an Internet-connected server for streaming the annotation video stream via the Internet.

8. The system of claim 7 wherein the annotation data stream first provides a first displayable indicia as a hyperlink, and in response to a backlink signal to the Internet-
10 connected server initiated by user interaction with the first displayable indicia, the server provides in the annotation data stream an animated graphic as a hyperlink.

9. The system of claim 8 wherein the first displayable indicia responds to a user interaction such as mouse-over to send the backlink signal, and wherein the animated
15 graphic provided in response in turn responds to user interaction to send a second backlink signal.

10. The system of claim 9 wherein the server responds to the second backlink signal by sending a third displayable indicia in the annotation data stream.

20

11. An interactive video system comprising:

a computerized display system comprising a video display apparatus, receiving apparatus for receiving and displaying both a primary video stream and an annotation stream on the display apparatus, a user input apparatus for a user to interact with
25 display entities, and a mechanism for sending backlink signals from the computerized display system; and

an Internet-connected server for providing at least the annotation data stream and connected to the computerized display system in a manner to receive the backlink signals;

wherein the annotation data stream provides a first displayable indicia as a hyperlink, and the server responds to a backlink signal resulting from user interaction with the first displayable indicia by providing in the annotation data stream a second displayable indicia.

5

12. The system of claim 11 wherein the second displayable indicia is also a hyperlink.

13. The system of claim 12 wherein the first displayable hyperlink sends a first backlink signal as a result of a mouse-over, and the second displayable indicia sends a

10 second backlink signal as a result of a mouse click.

14. The system of claim 13 wherein the second displayable indicia is a company logo.

15. The system of claim 14 wherein the company logo displays for a pre-determined
15 time period followed by a third displayable indicia.

16. The system of claim 13 wherein one of the first and second displayable indicia comprises an animated graphic in Graphics Image Format (GIF).

20 17. The system of claim 13 wherein the second displayable indicia comprises a Graphics Image Format (GIF) display, which persists in the display for a pre-determined time period, then disappears, and the annotation data stream from the server then provides a third displayable indicia.

25 18. The system of claim 11 wherein one or both of the first and second displayable indicia move in the display, directed by data in the annotation data stream.

19. The system of claim 18 wherein one or both of the first and second displayable indicia is associated with an image entity in the primary video stream, and moves with
30 the image entity.

20. A method for providing annotated data entities in a displayed video, comprising steps of:

- (a) streaming a primary video stream and an annotation data stream by a content provider;
- (b) displaying both the primary video stream and the annotation data stream at a viewing station connected to the content provider by at least one data link; and
- (c) providing an animated graphic which displays on the video display from the data in the annotation data stream.

10

21. The method of claim 20 wherein, in step (c), the animated graphic moves in the display, directed by data in the annotation data stream.

22. The method of claim 21 wherein the moving graphic is associated with an image entity displayed from the primary video stream, and moves with the image entity.

23. The method of claim 20 wherein the animated graphic displays as a hyperlink, and comprising a further step for interacting with the hyperlink by a user input pointer device for cursor control, such that user interaction with the animated graphic causes a second animated graphic to display.

24. The method of claim 23 wherein interacting with newly appearing animated graphics causes additional animated graphics to display.

25. The method of claim 23 comprising a further step wherein interaction with an animated graphic causes a back-link signal, and, in response to the backlink signal, the content provider streams an alternative annotation stream, providing an alternative display on the video display apparatus at the viewing station.

26. The method of claim 20 wherein the viewing station comprises a first high-bandwidth dedicated connection for receiving the primary video stream, and an Internet connection for receiving the annotation video stream, and the content provider comprises a first facility for streaming the primary video stream via the first
5 connection, and an Internet-connected server for streaming the annotation video stream via the Internet.

27. The method of claim 26 wherein the annotation data stream first provides a first displayable indicia as a hyperlink, and in response to a backlink signal to the Internet-
10 connected server initiated by user interaction with the first displayable indicia, the server provides in the annotation data stream an animated GIF as a hyperlink.

28. The method of claim 27 wherein the first displayable indicia responds to a mouse-over to send the backlink signal, and wherein the animated graphic provided in
15 response to the backlink signal responds to a mouse click to send a second backlink signal.

29. The method of claim 28 wherein the server responds to the second backlink signal by sending a third displayable indicia in the annotation data stream.

20

30. A method for providing annotated data entities in a displayed video, comprising steps of:

(a) streaming a primary video stream to a computerized video display system by a first streaming facility;

25 (b) streaming an annotation data stream to the computerized video display system by an Internet-connected server enabled to receive backlink signals;

(c) displaying both the primary video stream and the annotation data stream at the computerized video display system, the annotation data stream providing a first displayable indicia as a hyperlink;

(d) responding by the Internet-connected server to a backlink signal from user interaction with the first hyperlink by providing in the annotation data stream a second displayable indicia.

5 31. The method of claim 30 wherein, in step (d), the second displayable indicia is also a hyperlink.

32. The method of claim 31 wherein, in step (d) the first displayable hyperlink sends a first backlink signal as a result of a mouse-over, and the second displayable indicia
10 sends a second backlink signal as a result of a mouse click.

33. The method of claim 31 wherein the second displayable indicia is a company logo.

34. The method of claim 33 wherein the company logo displays for a pre-determined
15 time period and then disappears, and the annotation data stream from the server then provides a third displayable indicia.

35. The method of claim 30 wherein one of the first and second displayable indicia comprises an animated graphic in a suitable format.

20

36. The method of claim 32 wherein the second displayable indicia comprises an animated graphic display, which persists in the display for a pre-determined time period, then disappears, and the annotation data stream from the server then provides a third displayable indicia.

25

37. The method of claim 30 wherein one or both of the first and second displayable indicia move in the display directed by data in the annotation data stream.

38. The method of claim 37 wherein one or both of the first and second displayable
30 indicia is associated with an image entity in the primary video stream, and moves with

the image entity.

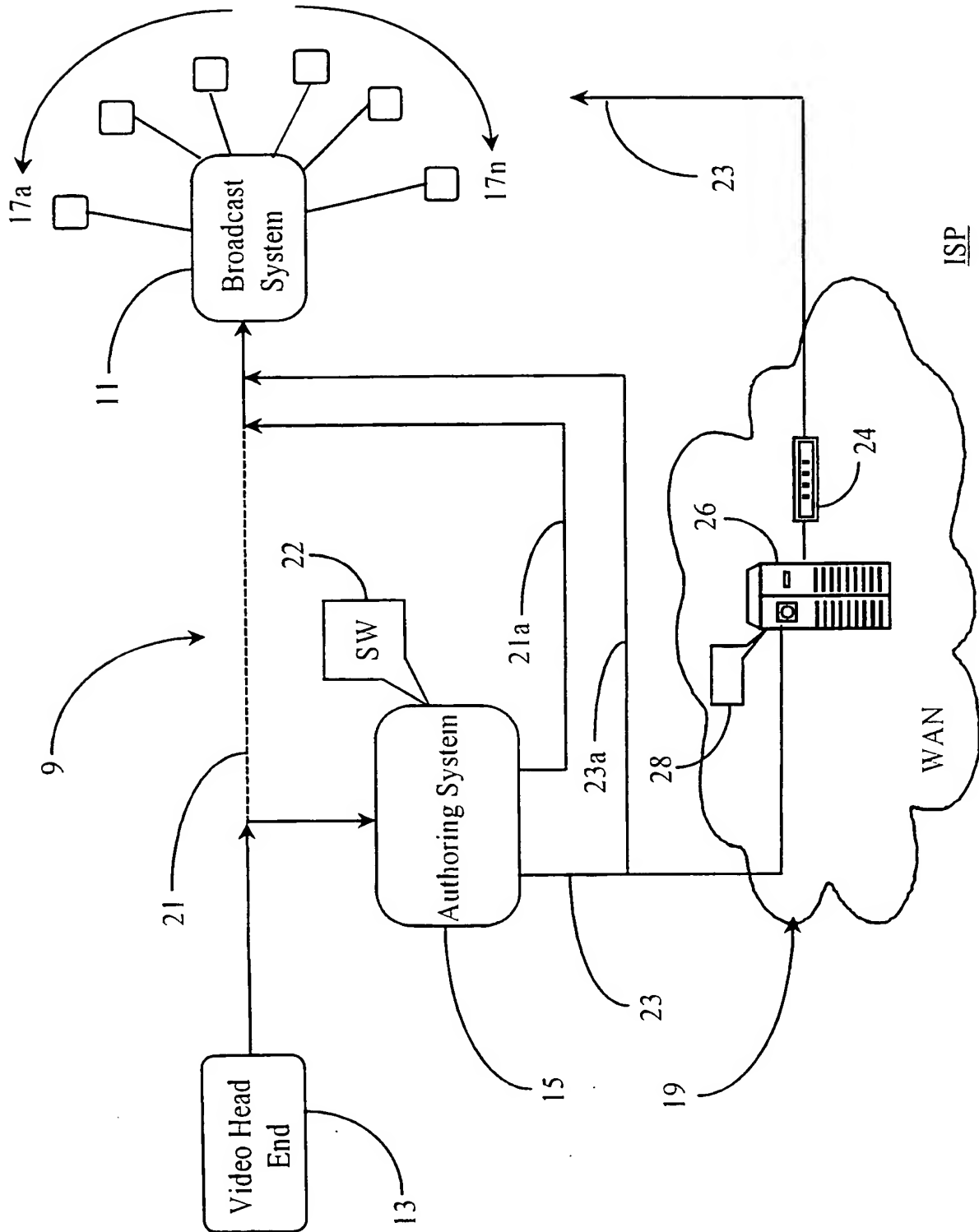


Fig. 1

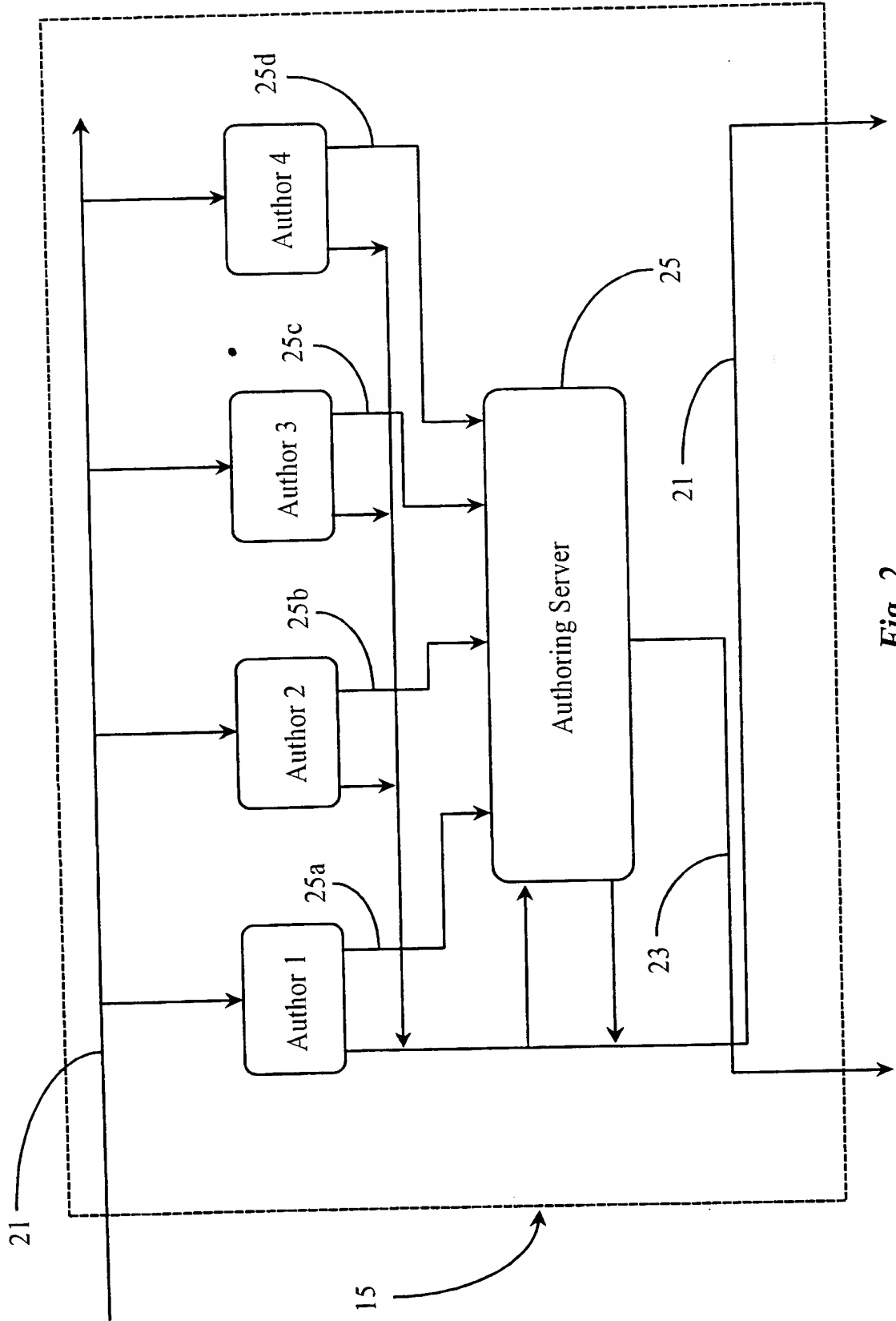


Fig. 2

3/6

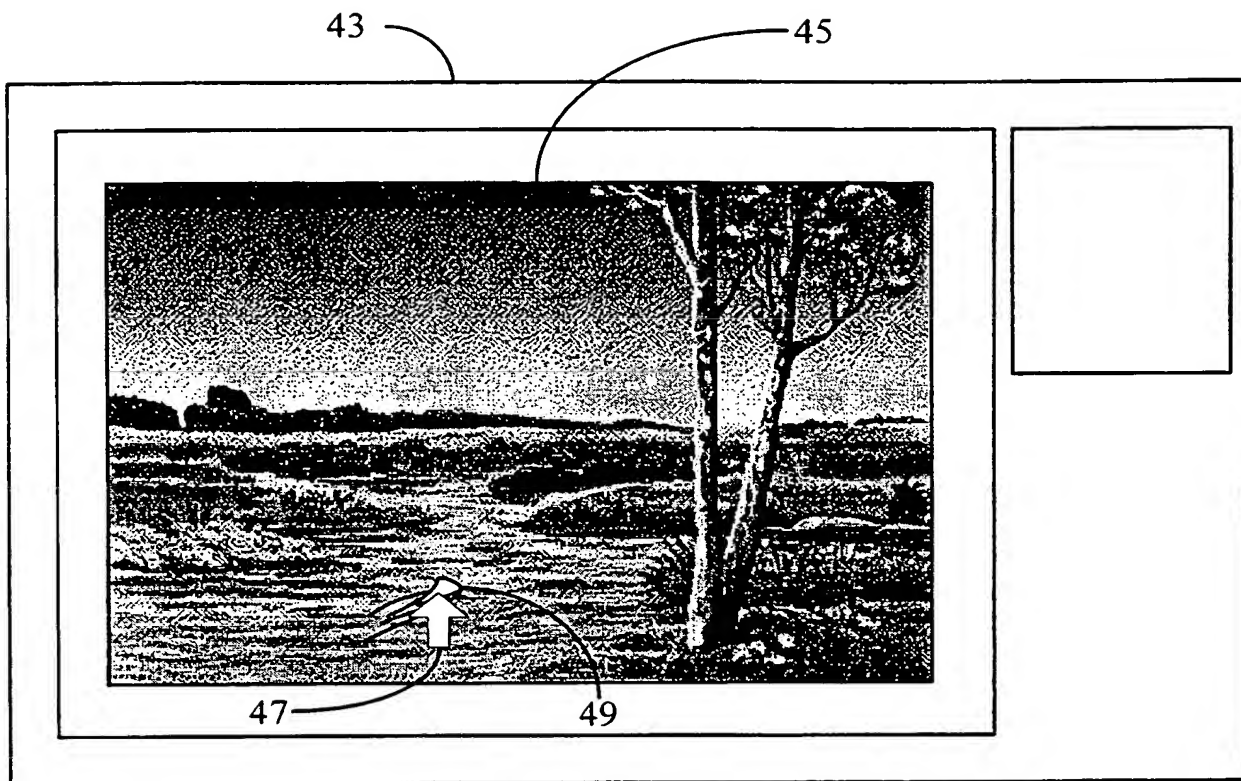


Fig. 3A

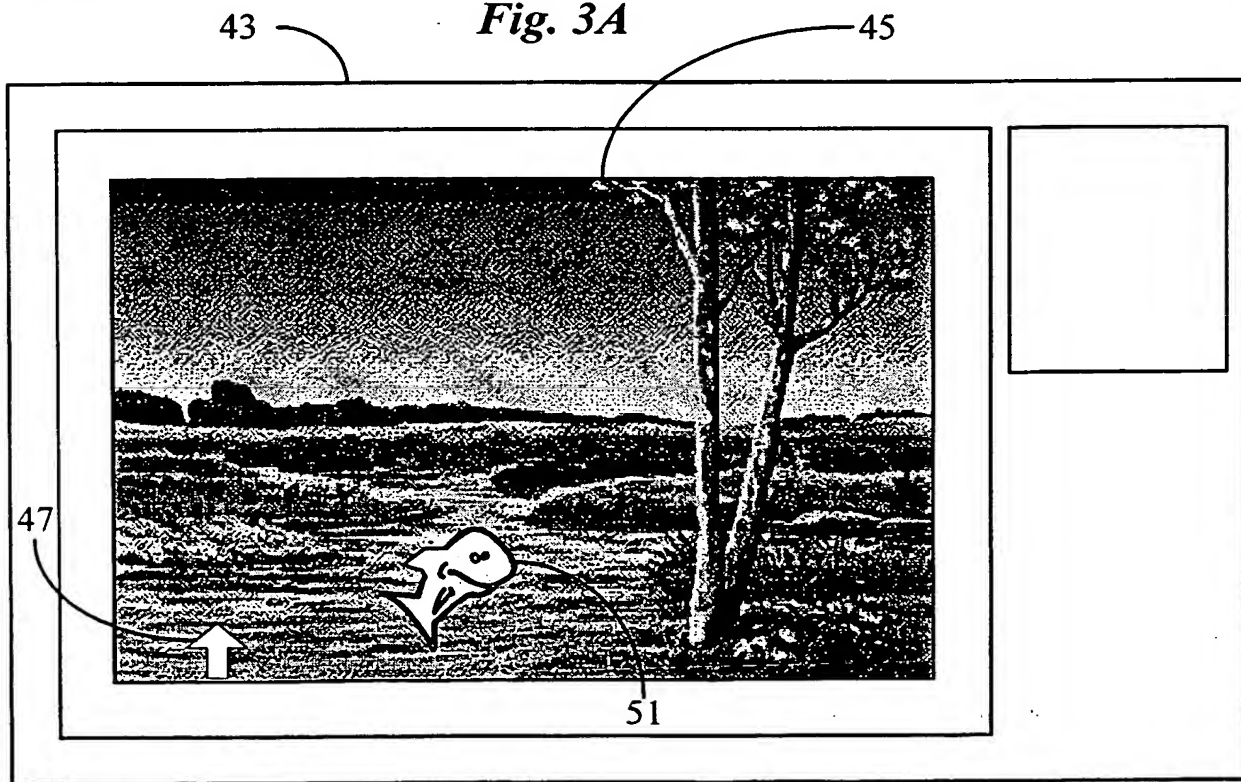


Fig. 3B

4/6

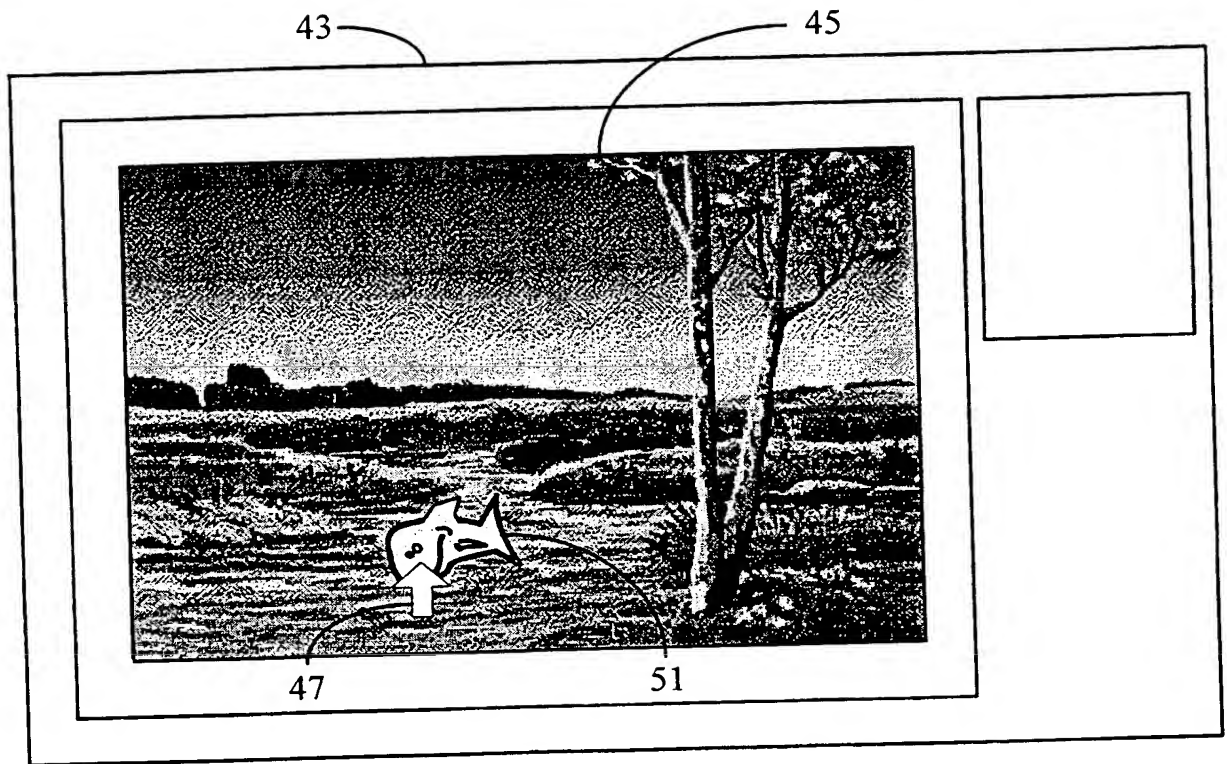


Fig. 3C

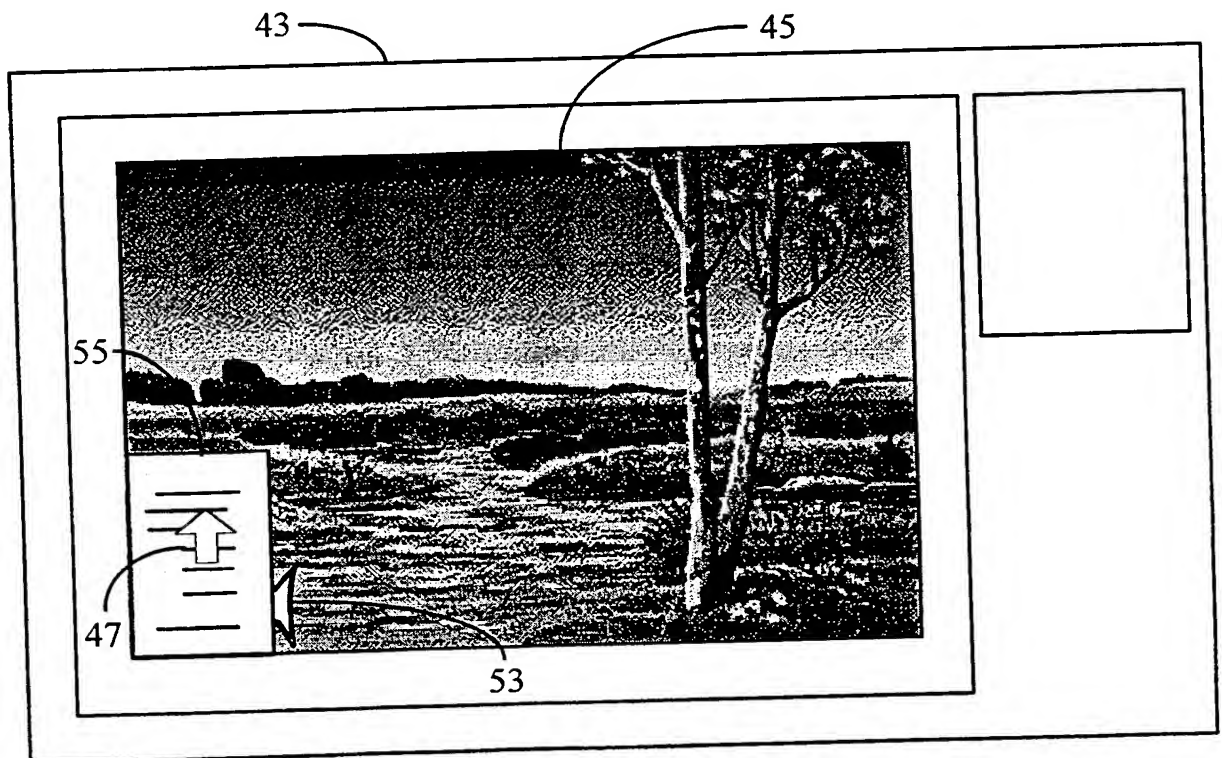


Fig. 3D

5/6

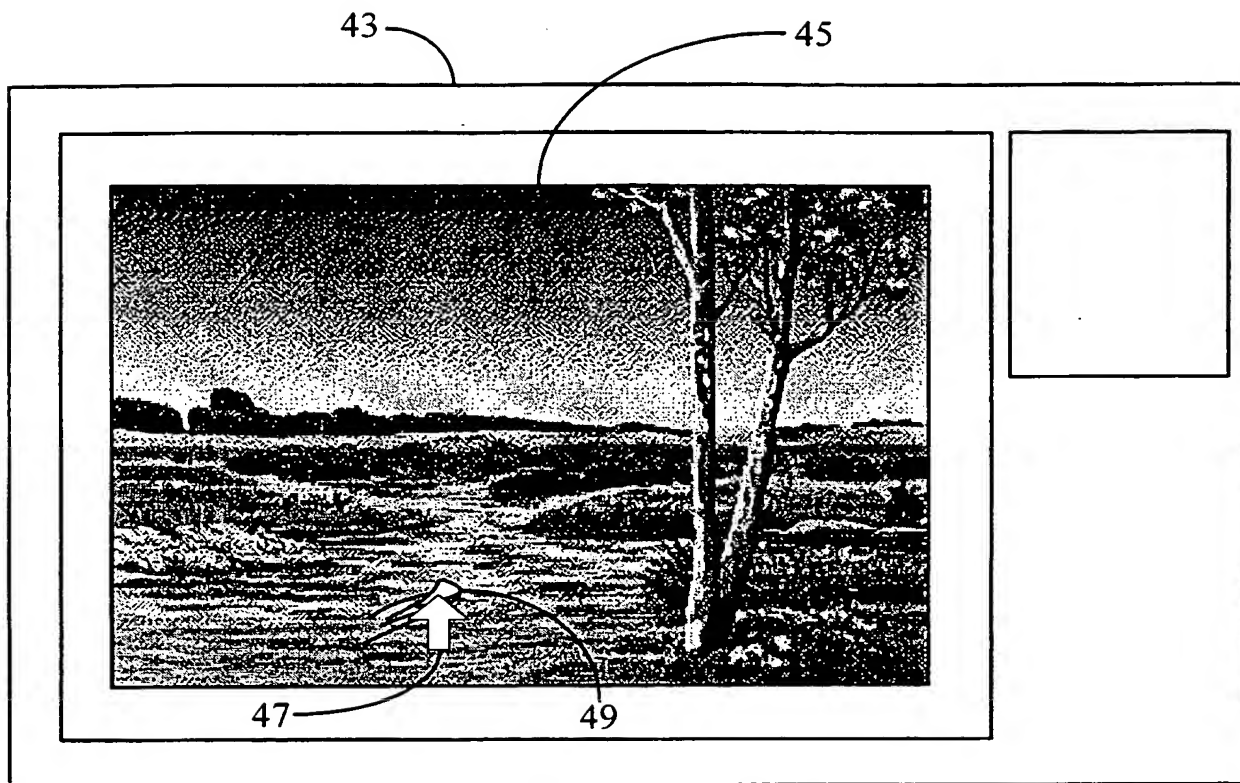


Fig. 4A

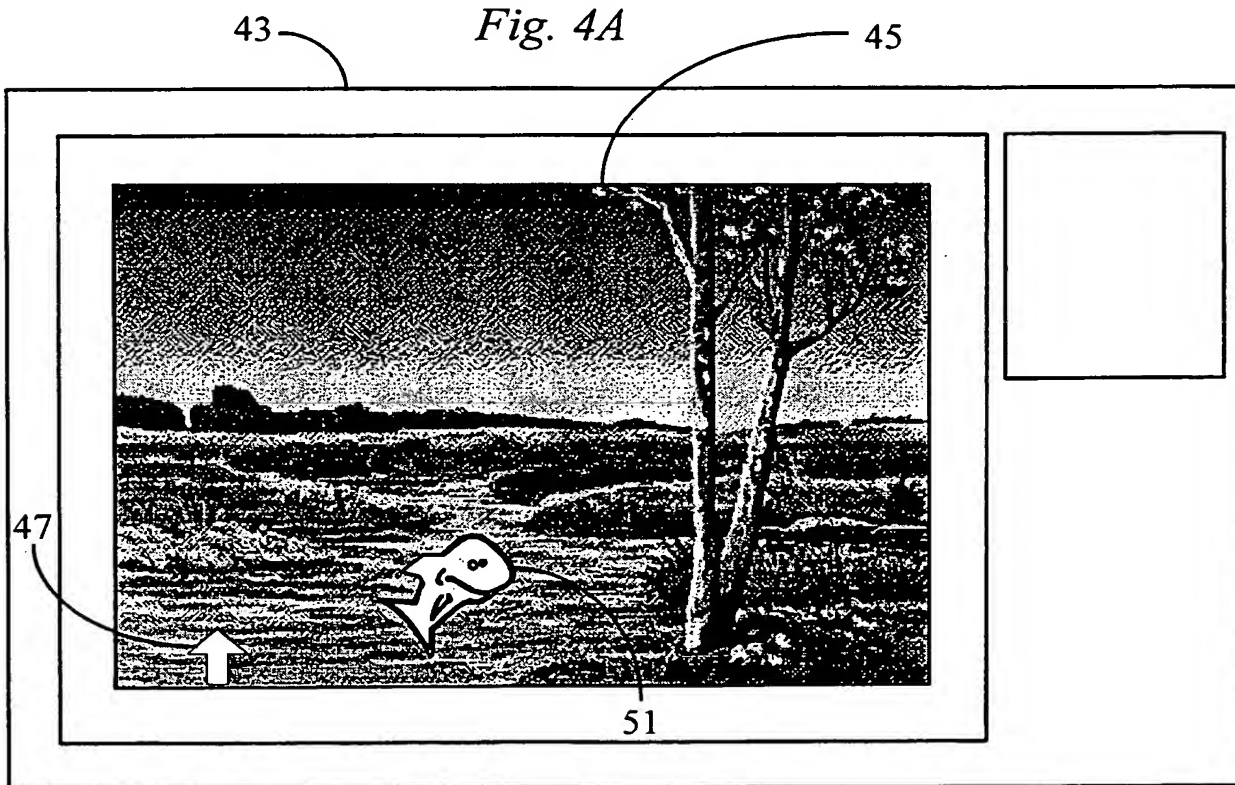


Fig. 4B

6/6

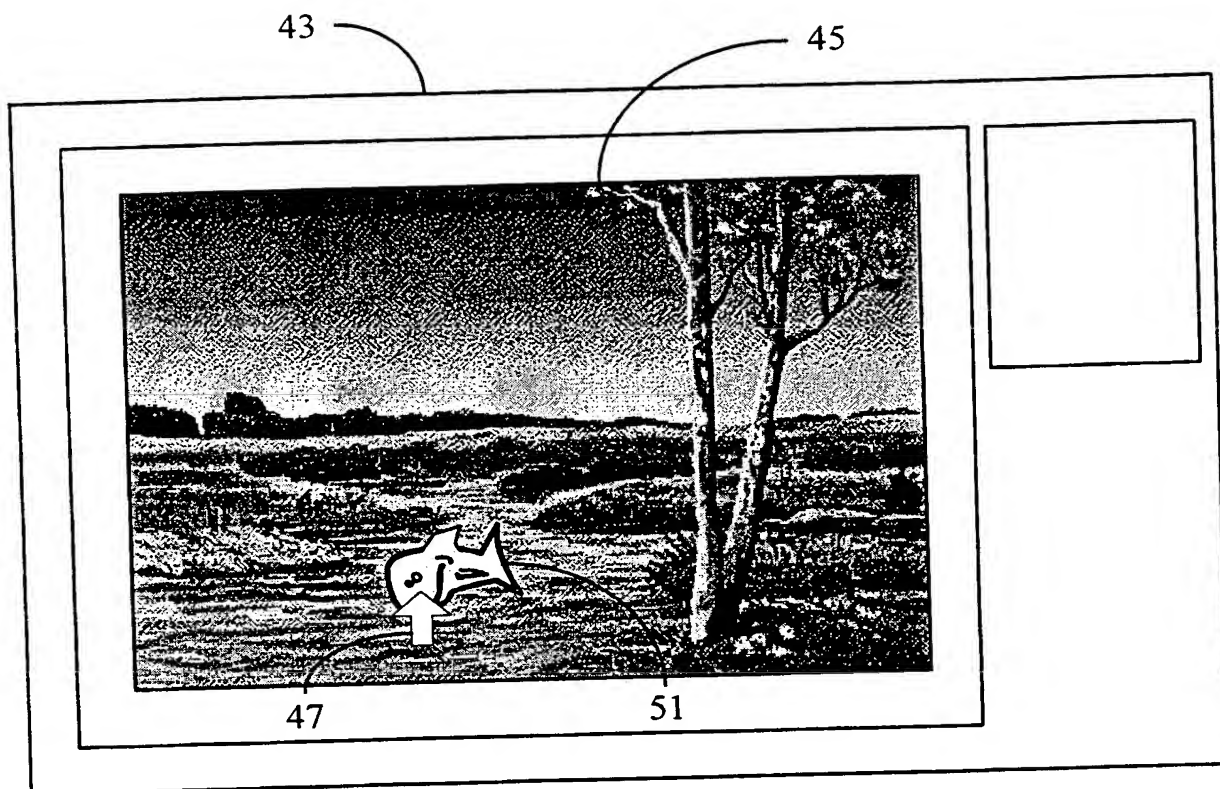


Fig. 4C

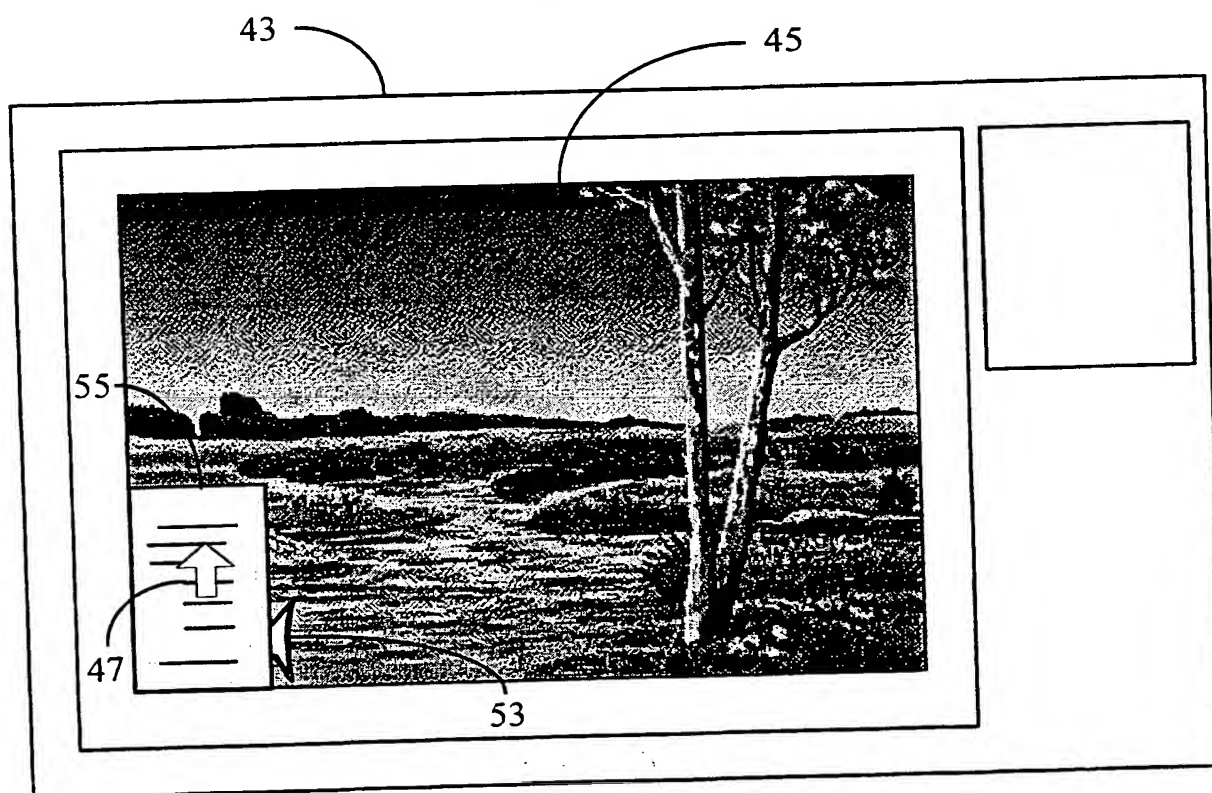


Fig. 4D

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/21707

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : G06F 13/00; H04N 7/173

US CL : 725/41, 112; 348/473.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 725/41, 112; 348/473.

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST

URL, hotspots, icon, or link; animated graphic

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,774,666 A (PORTUESI) 30 June 1998; Abstract; Fig. 2; Fog. 3; 3, lines 25-35; col. 4, lines 18-25; c ol. 8. lines 55-65.	1-38
Y	US 5,929,849 A (KIKINIS) 27 July 1999; Abstract; col. 9, lines 25-35; col. 3, lines 25-32.	1-38
Y	US 5,447,708 A (WOLFF) 08 December 1998; Fig. 2; col. 7, lines 28-45.	1-38
Y	US 5,880,731 A (LILES); 09 March 1999; Abstract, lines 1-5; col. 3, lines 4-45;	1-38
Y	US 5,883,621 A (IWAMURA) 16 March 1999; Abstract; col. 6, lines 15-18	1-38



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*Z* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

20 NOVEMBER 2000

Date of mailing of the international search report

26 JAN 2001

Name and mailing address of the ISA/US
Commissioner of Patents and Trademarks
Box PCT
Washington, D.C. 20231

Facsimile No. (703) 305-3230

Authorized officer

REUBEN BROWN

Telephone No. (703) 305-2399

THIS PAGE BLANK (USPTO)

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.

THIS PAGE BLANK (USPTO)